

Fundamentals of Genetics

Mendel's Legacy

1. What scientist is responsible for our study of heredity?
2. Define heredity.
3. What plant did Mendel use for his hereditary experiments?
4. Name the 7 characteristics, giving both dominant and recessive forms of the pea plants, in Mendel's experiments.
5. In order to study pea plant traits, Mendel had to control _____ among the plants.
6. Define pollination & name 2 types.
7. How do pea plants normally pollinate?
8. How can cross-pollination of pea plants be done?
9. How did Mendel obtain pure pea plants?
10. What is the P_1 generation? How is it obtained?
11. What is the F_1 generation & how is it obtained?
12. How did Mendel obtain his F_2 generation?
13. When Mendel crossed his P_1 plants to get the F_1 generation, what ratio did he get?
14. What is the difference between dominant & recessive genes?
15. State Mendel's law of segregation.
16. What are alleles?

Genetic Crosses

17. What is the difference between genotypes & phenotypes?
18. Write the 2 genotypes for a purple flower.
19. Write the genotype for a white flower.
20. What is the difference in a homozygous and a heterozygous genotype?
21. What is probability & tell 3 ways they can be expressed.
22. What is the probability that you will get "heads" each time you flip a coin?

23. What is a monohybrid cross?
24. Give an example of a monohybrid cross.
25. What is a Punnett Square used for?
26. Sketch the Punnett Square for crossing a pure purple flower with a white flower.
27. Use a Punnett Square to solve this cross --- PP x pp.
28. What percentage of the offspring from this cross are purple? White?
29. Use a Punnett Square to solve this cross in guinea pigs --- BB x Bb. Hint: See page 174.
30. In the above cross, what coat colors & percents did you get?
31. What phenotype (coat color) would each of these guinea pig genotypes result in:
 - a. Bb?
 - b. BB?
 - c. bb?
32. Use a Punnett Square to solve this cross for coat color in rabbits: Bb x Bb?
33. What percent of the rabbits will have black fur? Brown fur? What ratio does this give for coat color?
34. Define genotypic ratio.
35. What is the genotypic ratio for all F₁ crosses (bb x Bb)?
36. Define phenotypic ratio.
37. What is the phenotypic ratio for all F₁ crosses?
38. What is a testcross?
39. A testcross can determine which individual's phenotype is _____.
40. Use a Punnett Square to solve the following 2 testcrosses:
 - a. BB x Bb
 - b. bb x Bb
41. In each of the above testcrosses, tell how many offspring have black coats (dominant) and how many will have brown (recessive) coats?
42. What does complete dominance mean?

43. Give an example of complete dominance in pea plants.
44. What is incomplete dominance?
45. How many alleles influence the phenotype in:
- a. complete dominance?
 - b. incomplete dominance?
46. Using four-o'clocks, give an example of how incomplete dominance occurs. Be sure to tell all possible genotypes & phenotypes.
47. Give the following ratios for crossing 2 pink four-o'clocks ($Rr \times Rr$):
- a. Genotypic ratio?
 - b. Phenotypic ratio?
48. Define codominance.
49. In what genotype does codominance appear?
50. In horses, _____ coat color is a result of codominance.
51. Write the genotype for roan coat color & tell the color of each allele in the genotype.
52. What is a dihybrid cross?
53. How many different genotypes will result in a dihybrid cross when 2 homozygous organisms are crossed?
54. The offspring from a dihybrid cross of 2 homozygous organisms will all be _____.
55. Use a Punnett Square to show the results of the following cross: $RrYy \times RrYy$
56. How many different genotypes resulted from this cross?
57. How many different phenotypes resulted from this cross?
58. Write the genotypes for each of these phenotypes:
- a. Round, green seeds
 - b. Wrinkled, yellow seeds
 - c. Wrinkled, green seeds